US009511688B2

(12) **United States Patent**
Linnenbrink et al.

(10) **Patent No.: US 9,511,688 B2**
(45) **Date of Patent: Dec. 6, 2016**

(54) SEATING PART OF A VEHICLE SEAT

(71) Applicant: **Johnson Controls Technology Company**, Holland, MI (US)

(72) Inventors: **Jorg Linnenbrink**, Wuppertal (DE); **Ingo Kienke**, Wermelskirchen (DE); **Gerhard Rothstein**, Velbert (DE)

(73) Assignee: **Johnson Controls Technology Company**, Holland, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 105 days.

(21) Appl. No.: **14/398,820**

(22) PCT Filed: **May 7, 2013**

(86) PCT No.: **PCT/IB2013/001403**
§ 371 (c)(1),
(2) Date: **Jan. 16, 2015**

(87) PCT Pub. No.: **WO2013/167975**
PCT Pub. Date: **Nov. 14, 2013**

(65) **Prior Publication Data**

US 2015/0123442 A1 May 7, 2015

Related U.S. Application Data

(60) Provisional application No. 61/643,587, filed on May 7, 2012.

(30) **Foreign Application Priority Data**

Jul. 4, 2012 (DE) 10 2012 013 208

(51) **Int. Cl.**

A47C 1/00	(2006.01)
B60N 2/235	(2006.01)

(Continued)

(52) **U.S. Cl.**
CPC ***B60N 2/235*** (2013.01); ***B60N 2/07*** (2013.01); ***B60N 2/0715*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B60N 2/235; B60N 2/07; B60N 2/0715; B60N 2/0722; B60N 2/08; B60N 2/161; B60N 2/1615; B60N 2/1814; B60N 2/20; B60N 2/22; B60N 2/427; B60N 2/66; B60N 2/68; B60N 2/686; B60N 2205/20
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,220,767	A	11/1965	Hendrickson
3,695,696	A	10/1972	Lohr et al.

(Continued)

FOREIGN PATENT DOCUMENTS

DE	893854	C	10/1953
DE	2152104	A1	4/1973

(Continued)

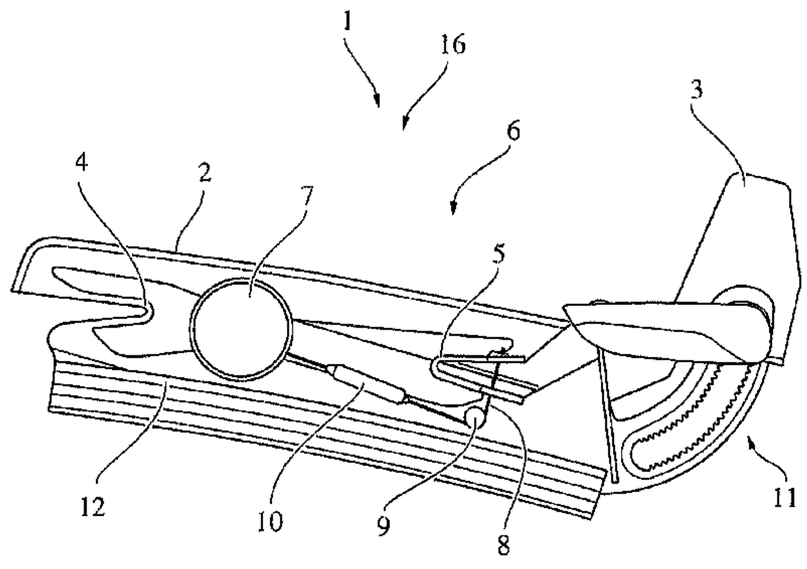
OTHER PUBLICATIONS

Office Action for U.S. Appl. No. 14/399,007, dated Oct. 27, 2015.
(Continued)

Primary Examiner — Jose V Chen
(74) *Attorney, Agent, or Firm* — The Dobrusin Law Firm, P.C.

(57) ABSTRACT

A vehicle seat including a seat member, having a seat face and two lateral members. The seat face may be provided between the lateral members in an integral manner. The vehicle seat may further include a height adjuster for adjusting a height of the seat face, and the height adjuster may be integrated in the lateral members. Each of the lateral members may have a recess, the shape of which may change
(Continued)



during the height adjustment. The height adjuster may include a drive element. The drive element may include a rotor with helical slots. The lateral members may have projections provided which cooperate in a positive-locking manner with the helical slots. During rotation of the rotor, the projections may be moved away from each other or toward each other. Height adjustment of the seat face may be carried out.

9 Claims, 5 Drawing Sheets

(51) **Int. Cl.**

B60N 2/22	(2006.01)
B60N 2/68	(2006.01)
B60N 2/07	(2006.01)
B60N 2/16	(2006.01)
B60N 2/18	(2006.01)
B60N 2/427	(2006.01)
B60N 2/66	(2006.01)
B60N 2/08	(2006.01)
B60N 2/20	(2006.01)

(52) **U.S. Cl.**

CPC ***B60N 2/0722*** (2013.01); ***B60N 2/08*** (2013.01); ***B60N 2/161*** (2013.01); ***B60N 2/1615*** (2013.01); ***B60N 2/1814*** (2013.01); ***B60N 2/20*** (2013.01); ***B60N 2/22*** (2013.01); ***B60N 2/427*** (2013.01); ***B60N 2/66*** (2013.01); ***B60N 2/68*** (2013.01); ***B60N 2/686*** (2013.01); *B60N 2205/20* (2013.01)

(58) **Field of Classification Search**

USPC 297/344.12, 344.1

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,759,587	A	9/1973	Christin	
3,874,727	A	4/1975	Mehnert et al.	
3,877,750	A	4/1975	Scholpp	
4,379,589	A	4/1983	Marino	
4,451,085	A	5/1984	Franck et al.	
4,502,730	A	3/1985	Kazaoka et al.	
4,585,272	A	4/1986	Ballarini	
4,647,109	A	3/1987	Christophersen et al.	
4,913,493	A	4/1990	Heidmann	
4,995,669	A	2/1991	Croft	
4,997,223	A	3/1991	Croft	
5,067,772	A	11/1991	Koa	
5,154,476	A	10/1992	Haider et al.	
5,163,735	A	11/1992	Aljundi	
5,251,864	A *	10/1993	Itou	B60N 2/502 248/588
5,320,410	A	6/1994	Faiks et al.	
5,346,281	A	9/1994	Hughes	
5,433,507	A *	7/1995	Chang	B60N 2/2352 297/354.12
5,466,048	A	11/1995	Fowler et al.	
5,468,048	A	11/1995	Clemens et al.	
5,577,811	A	11/1996	Ogg	
5,704,691	A	1/1998	Olson	
5,733,008	A	3/1998	Tame	
5,934,753	A	8/1999	Lange	
5,984,407	A	11/1999	Ligon, Sr. et al.	
6,022,075	A	2/2000	Blocker et al.	
6,193,318	B1	2/2001	Becker et al.	
6,341,819	B1 *	1/2002	Kojima	B60N 2/071 248/429
6,422,651	B1 *	7/2002	Muhlberger	B60N 2/167 248/157
6,520,581	B1 *	2/2003	Tame	B60N 2/206 296/65.01
6,565,156	B1	5/2003	Yamashita et al.	
6,592,186	B1 *	7/2003	Muhlberger	B60N 2/167 297/344.12
6,609,753	B2	8/2003	Schmidt-Schaeffer	
6,935,693	B2 *	8/2005	Janscha	B60N 2/502 248/550
6,955,399	B2	10/2005	Hong	
7,278,686	B2 *	10/2007	Yoshida	B60N 2/165 248/421
7,740,316	B2 *	6/2010	Beneker	B60R 22/26 297/344.11
7,837,273	B1	11/2010	Ratza et al.	
7,926,879	B2	4/2011	Schmitz et al.	
7,959,229	B2 *	6/2011	Ishijima	B60N 2/0296 297/337
8,162,404	B2 *	4/2012	Ueda	B60N 2/0296 297/344.12
8,333,530	B2	12/2012	Omori	
8,376,456	B2	2/2013	Fujita et al.	
8,480,152	B2 *	7/2013	Shimizu	B60N 2/3011 296/65.09
2002/0060487	A1 *	5/2002	Makosa	B60N 2/1615 297/344.1
2002/0089225	A1	7/2002	Bruck et al.	
2003/0006636	A1	1/2003	Ligon, Sr. et al.	
2003/0218368	A1	11/2003	Akaike et al.	
2004/0160099	A1	8/2004	Hong	
2005/0062326	A1 *	3/2005	Kim	B60N 2/01583 297/344.1
2005/0179290	A1	8/2005	Hancock et al.	
2005/0285008	A1	12/2005	Beneker et al.	
2006/0055219	A1	3/2006	Heimann et al.	
2006/0152051	A1	7/2006	Colja et al.	
2006/0226683	A1	10/2006	Massara et al.	
2006/0244293	A1	11/2006	Buffa	
2007/0090263	A1	4/2007	Yamada et al.	
2007/0108816	A1	5/2007	McQueen et al.	
2009/0026811	A1	1/2009	Samain et al.	
2009/0096263	A1	4/2009	Samain et al.	
2009/0174241	A1	7/2009	Pattyn et al.	
2009/0288270	A1	11/2009	Yamashita	
2010/0026069	A1 *	2/2010	Bruck	B60N 2/20 297/344.1
2010/0026070	A1 *	2/2010	Rohee	B60N 2/0248 297/344.1
2010/0096897	A1 *	4/2010	Kienke	B60N 2/2352 297/367 R
2010/0117419	A1	5/2010	Schmitz et al.	
2010/0133732	A1	6/2010	Yamaguchi et al.	
2010/0201173	A1	8/2010	Boes	
2011/0006581	A1	1/2011	Funk et al.	
2011/0042514	A1	2/2011	Ehlers et al.	
2011/0042515	A1	2/2011	Schoke et al.	
2011/0115268	A1	5/2011	Maierhofer et al.	
2011/0127817	A1	6/2011	Yu et al.	
2011/0304188	A1	12/2011	Aktas	
2011/0316317	A1 *	12/2011	Sprenger	B60N 2/206 297/344.1
2012/0119555	A1	5/2012	Aktas	
2012/0133183	A1	5/2012	Kim et al.	
2012/0228911	A1	9/2012	Piretti	
2013/0075571	A1	3/2013	Suck et al.	
2013/0248675	A1	9/2013	Ewald et al.	
2013/0313876	A1 *	11/2013	Perrin	B60N 2/24 297/344.13
2013/0341982	A1	12/2013	Maierhofer et al.	
2014/0138996	A1 *	5/2014	Kramm	B60N 2/0881 297/344.1
2015/0108805	A1 *	4/2015	Linnenbrink	B60N 2/546 297/325
2015/0123442	A1	5/2015	Linnenbrink et al.	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2015/0151653	A1*	6/2015	Furuta	B60N 2/68 297/344.15
2015/0203011	A1*	7/2015	Fujita	B60N 2/68 297/284.11
2015/0314709	A1*	11/2015	Kim	B60N 2/165 297/344.12

FOREIGN PATENT DOCUMENTS

DE	2723722	A1	12/1978
DE	3937818	A1	5/1991
DE	19639109	A1	3/1998
DE	19961070	C1	4/2001
DE	202006007862	U1	9/2007
DE	102008039166	A1	2/2010
DE	102009043298	A1	5/2011
DE	102011106219	A1	1/2012
EP	0842807	A1	5/1998
FR	703111	A	4/1931
FR	2718398	A1	10/1995
FR	2889120	A1	2/2007
JP	S5735648	B2	7/1982
JP	S57143930	U	9/1982
JP	S59177009	A	10/1984
JP	S608121	A	1/1985
JP	60160911	U	10/1985
JP	S616038	A	1/1986
JP	S6275735	U	5/1987
JP	H04189635	A	7/1992
JP	H04115448	U	10/1992
JP	H07205690	A	8/1995
JP	S6328043	U	2/1998
JP	2001105949	A	4/2001
JP	2005289187	A	10/2005
JP	2009154821	A	7/2009
KR	2019970008834	A	3/1997
KR	1020030064150	A	7/2003
KR	1020100049059	A	5/2010
WO	93/25404	A1	12/1993
WO	94/07393	A1	4/1994
WO	9501888	A1	1/1995
WO	9720706	A1	6/1997
WO	03/068557	A1	8/2003
WO	2012009515	A1	1/2012
WO	2013/167975	A2	11/2013
WO	2013/169714	A1	11/2013
WO	2013/169715	A1	11/2013
WO	2013/169717	A1	11/2013
WO	2013/169718	A1	11/2013
WO	2013/169719	A1	11/2013
WO	2013/169720	A1	11/2013

OTHER PUBLICATIONS

Office Action for U.S. Appl. No. 14/398,498, dated Sep. 24, 2015.
Office Action for U.S. Appl. No. 14/398,577, dated Sep. 22, 2015.
Japanese Office Action for Japanese Patent Application No. 2015-510889, dated Dec. 25, 2015.
Office Action for U.S. Appl. No. 14/399,015 dated Feb. 16, 2016.
Office Action for U.S. Appl. No. 14/399,038 dated Mar. 1, 2016.
Preliminary Rejection for Korean Patent Application No. 1020147034283 dated Mar. 7, 2016.
International Preliminary Report on Patentability for Application No. PCT/IB2013/001403, dated Nov. 20, 2014.
International Search Report for Application No. PCT/IB2013/001403, dated Jun. 12, 2013.
Chinese Office Action for Related Chinese Application No. 201380033326,8, dated Jun. 15, 2016.
Office Action for U.S. Appl. No. 14/398,498 dated Jun. 6, 2016.
Office Action for U.S. Appl. No. 14/399,007 dated Apr. 29, 2016.
Office Action for U.S. Appl. No. 14/398,768 dated Jun. 9, 2016.
Office Action for U.S. Appl. No. 14/399,015 dated Aug. 18, 2016.
Office Action for U.S. Appl. No. 14/398,498 dated Sep. 29, 2016.
Office Action for U.S. Appl. No. 14/398,768 dated Oct. 6, 2016.

* cited by examiner

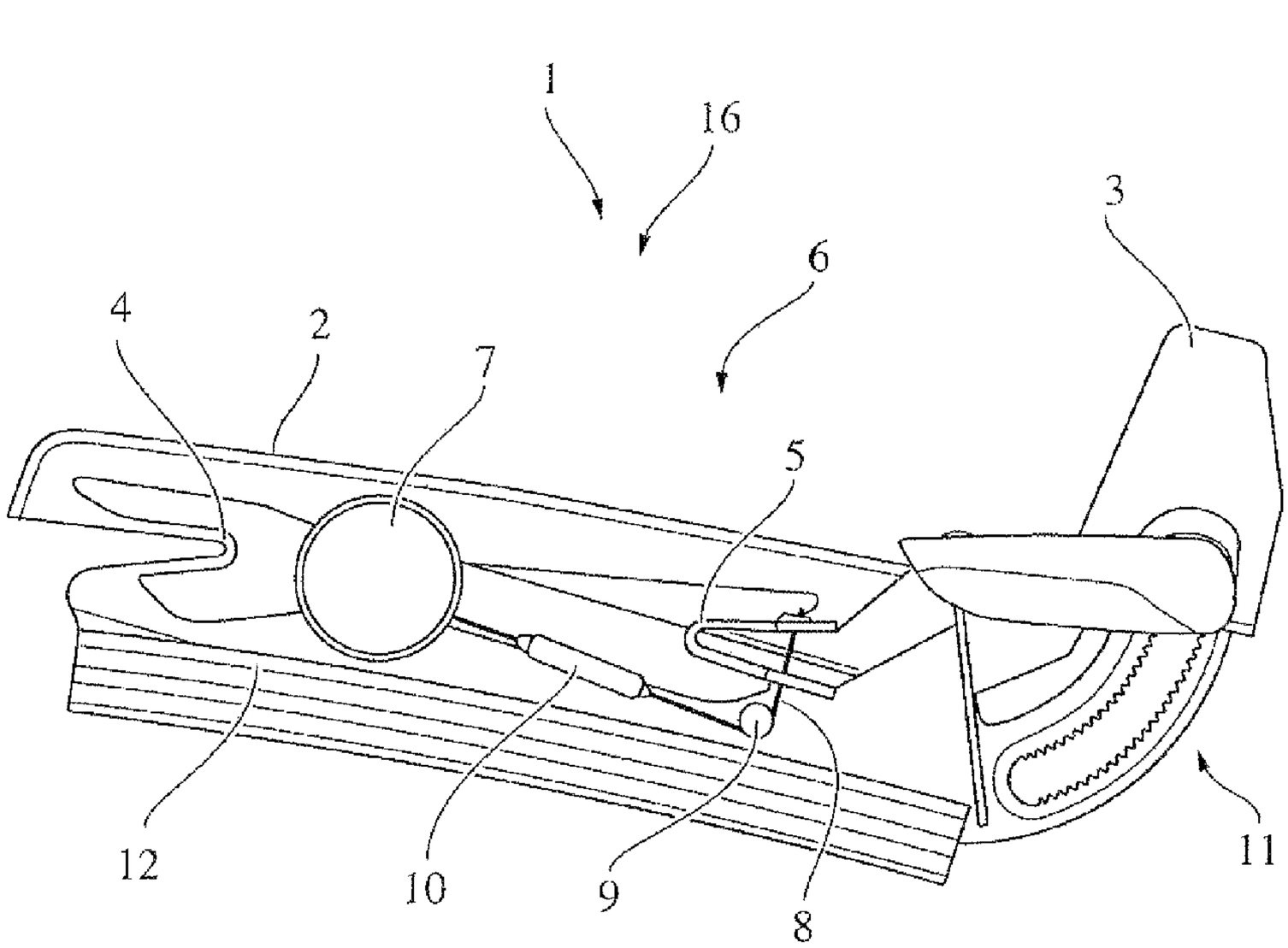


Fig. 1

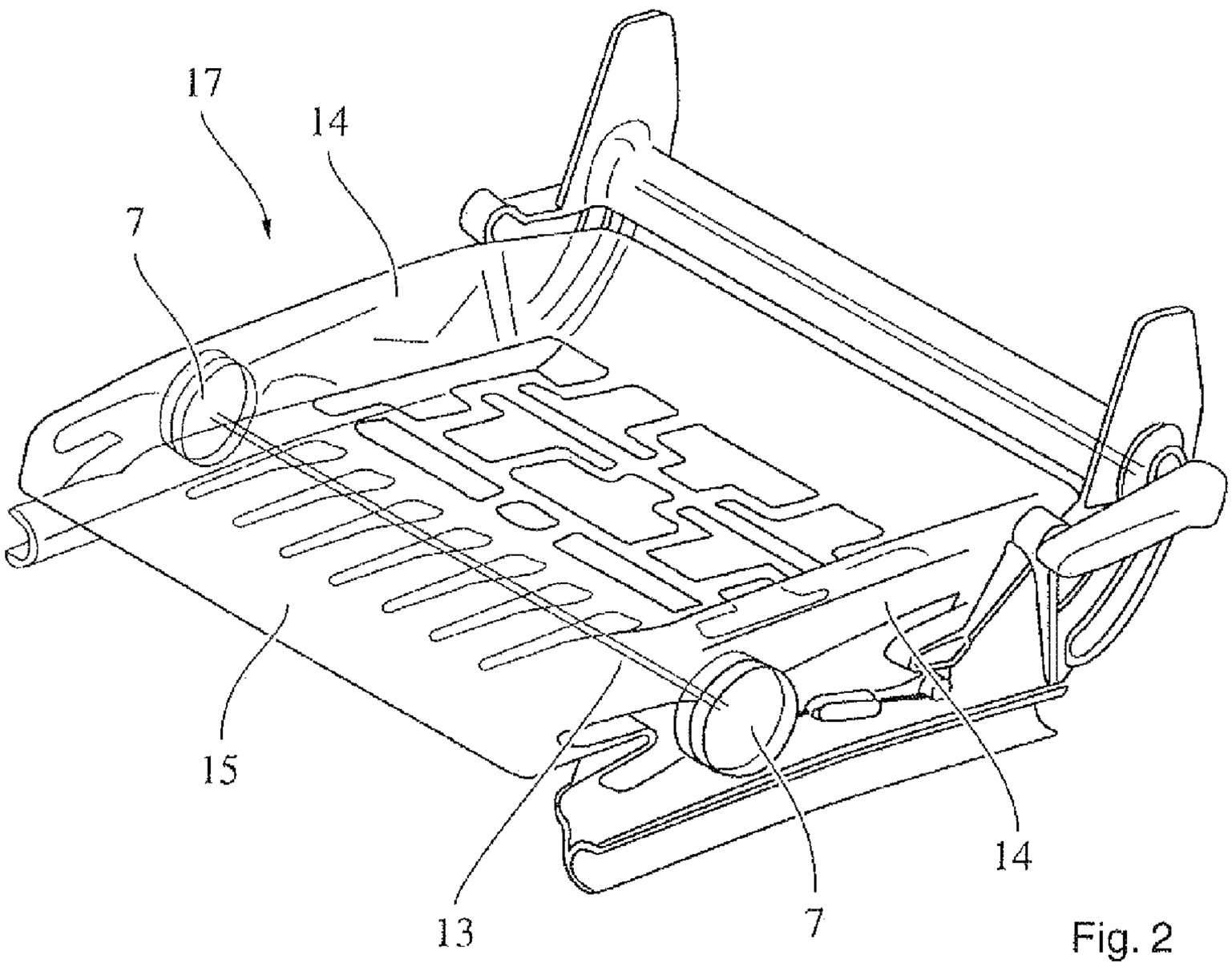


Fig. 2

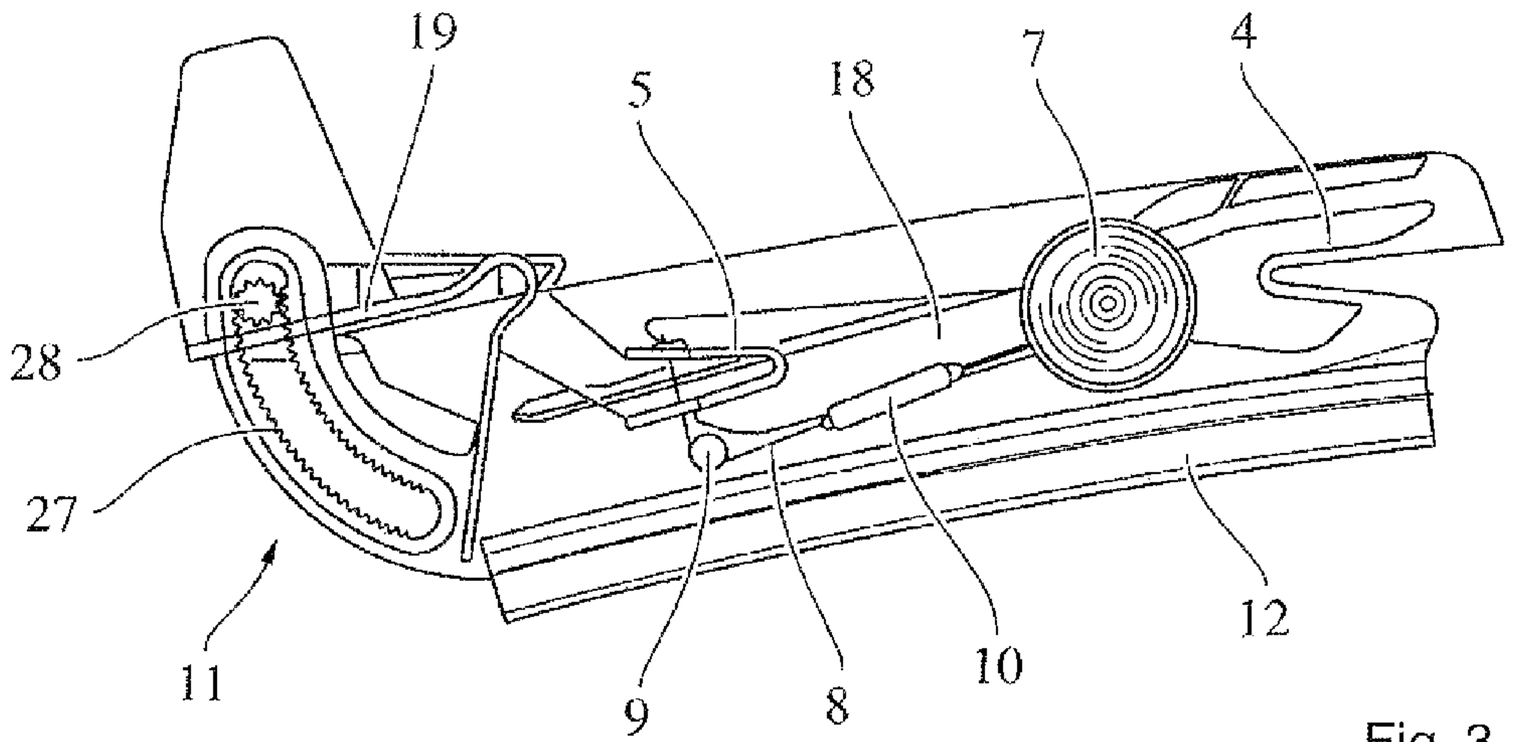


Fig. 3

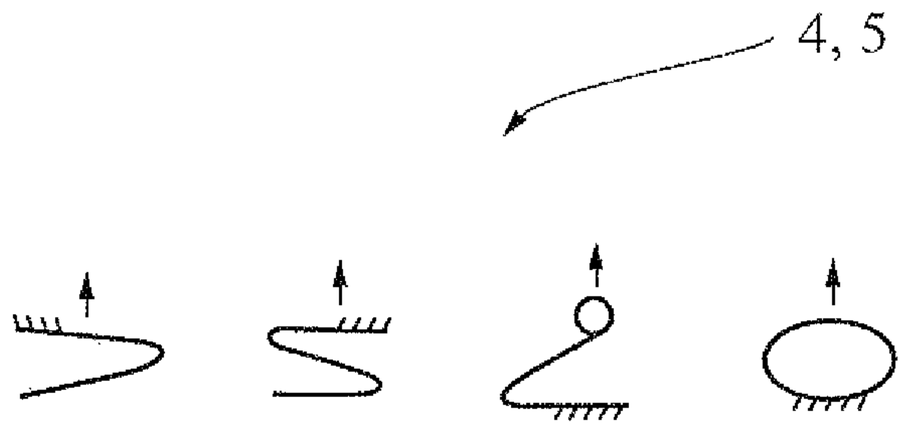


Fig. 4

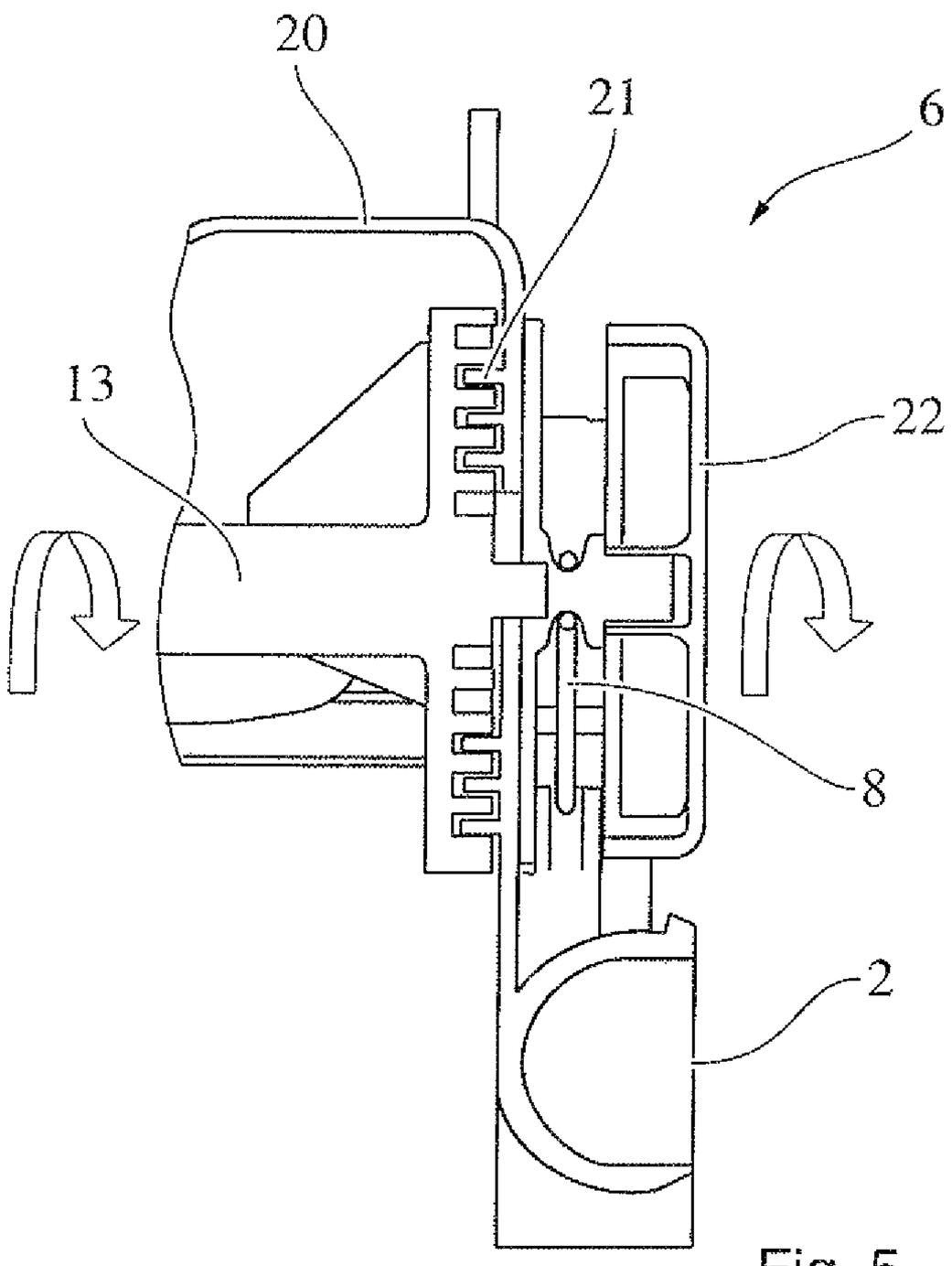


Fig. 5

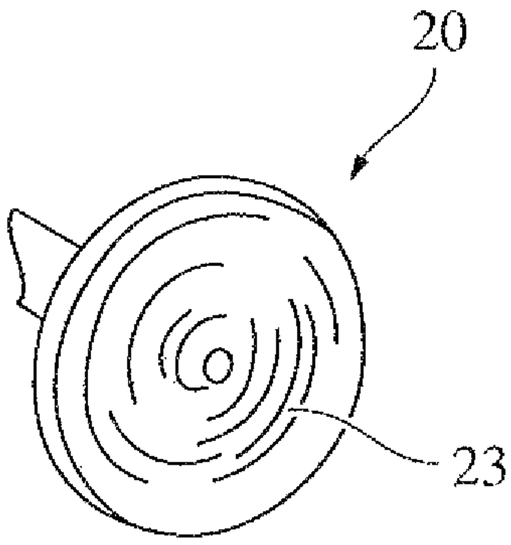


Fig. 5a

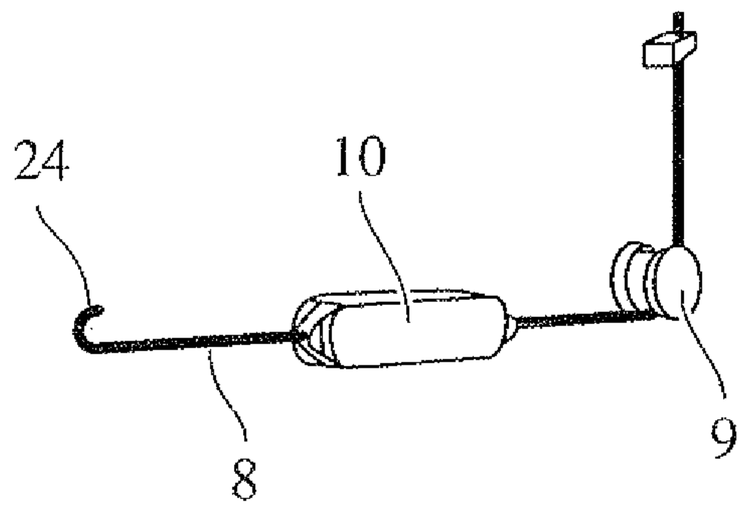


Fig. 5b

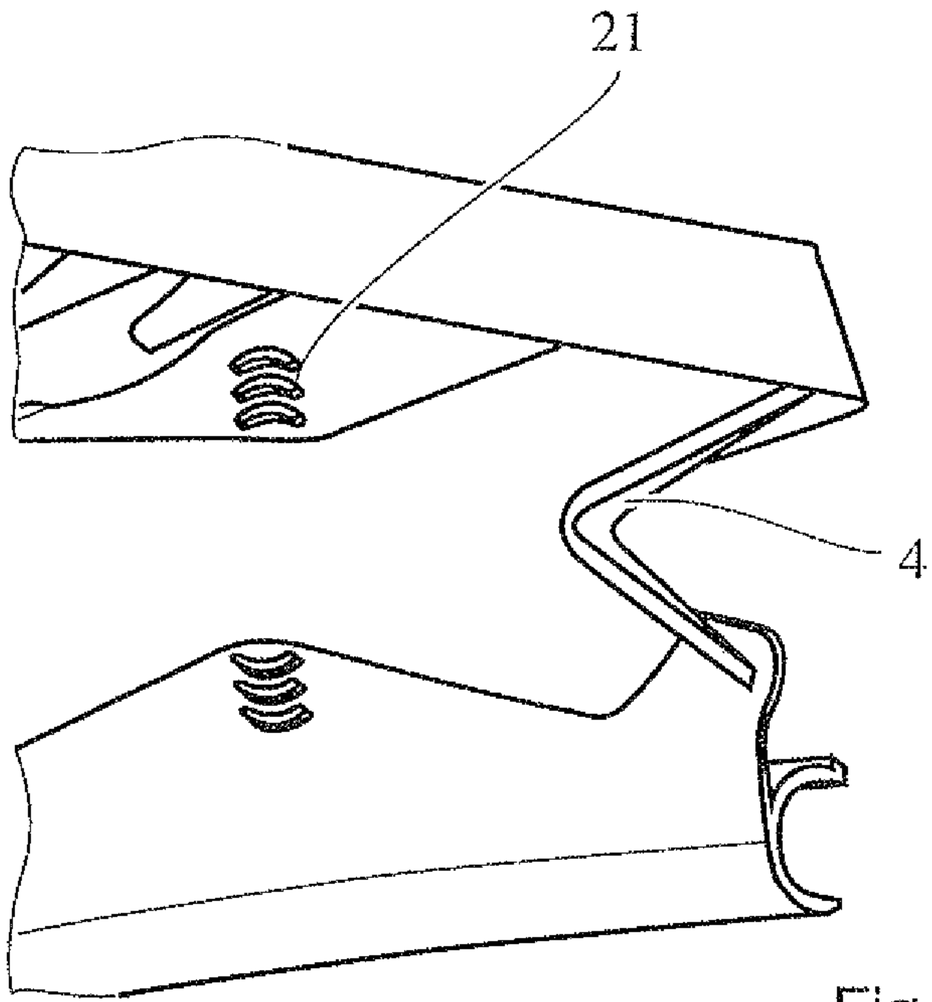


Fig. 6

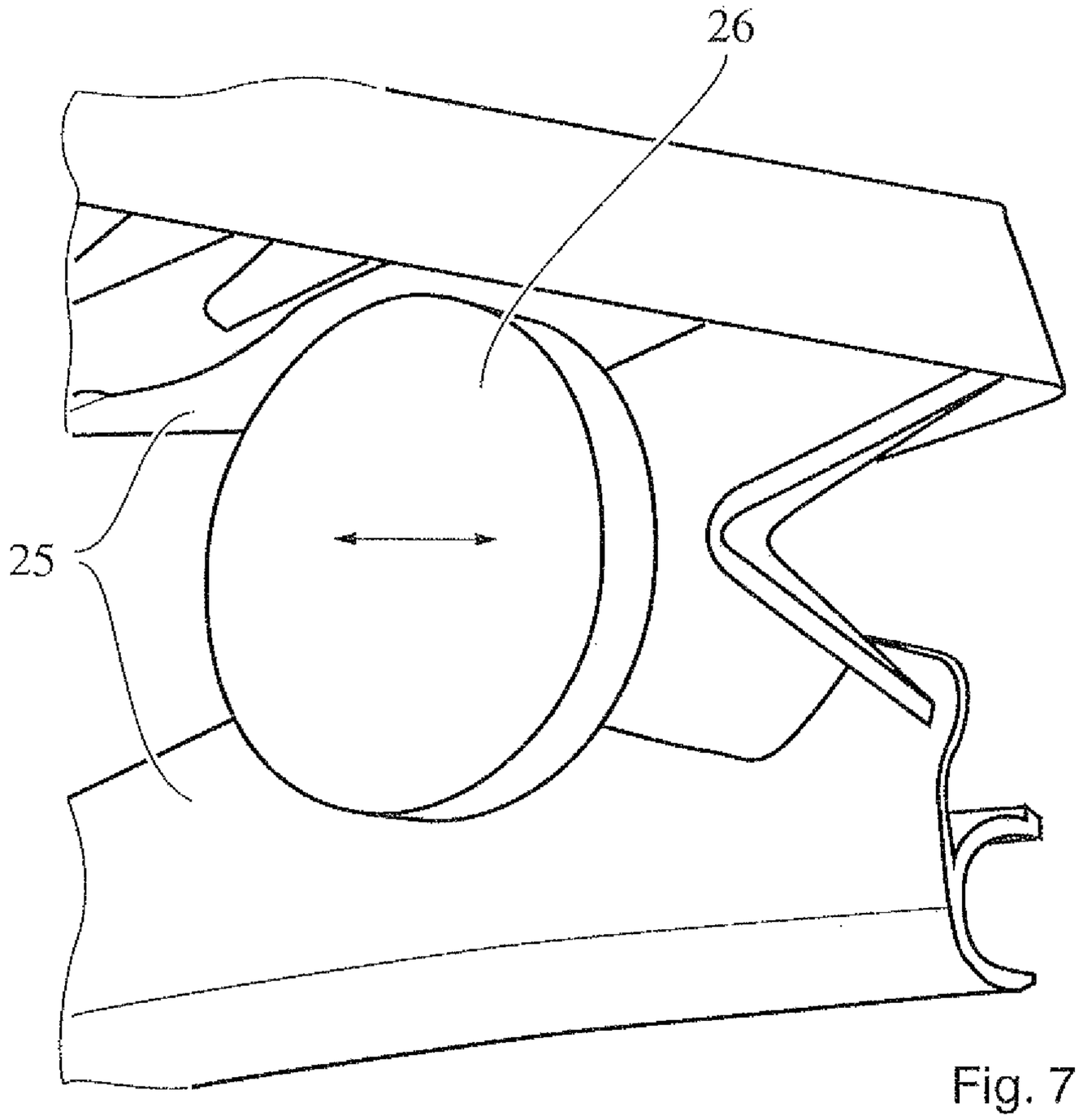


Fig. 7

SEATING PART OF A VEHICLE SEAT

The present invention relates to a vehicle seat having a seat member having a seat face and two lateral members.

Such vehicle seats are adequately known from the prior art but often have the disadvantage that they have a comparatively complex structure and/or an excessively great weight.

An object of the present invention was therefore to provide a vehicle seat which does not have the disadvantages of the prior art.

The object is achieved with a vehicle seat having a seat member having a seat face and two lateral members in which the seat face and the lateral members are provided in an integral manner.

The statements made relating to this subject matter of the present invention apply to the other aspects of the subject matter of the present invention in the same manner and vice versa.

The present invention relates to a vehicle seat. Such a vehicle seat may provide space for one or more persons. The vehicle seat according to the invention may consequently also be a bench-type seat. A backrest is preferably supported, in particular in a rotatable manner, on the seat member. This vehicle seat has a seat face which is generally provided with padding and/or a cover. To the right and to the left of the seat face are lateral members on which the upper rail of a longitudinal adjuster is generally arranged. There is provision according to the invention for the seat face and the lateral members to be provided in an integral manner. The assembly of the vehicle seat according to the invention is thereby considerably simplified. Connections, for example, welding, rivet and/or screw connections between the lateral members and the seat face, may be dispensed with. The upper rail of a longitudinal adjuster and/or the backrest connection of the backrest to the seat member is also preferably integrally connected to the lateral member.

The seat face and the lateral members and optionally the upper rail and/or the backrest connection are preferably produced from a plastics material, in particular a fiber-reinforced plastics material. The seat member may be produced, for example, by means of shaping or primary shaping, for example, with a mold filling method, such as, for example, injection or injection molding, a reinforcement material, for example, a fiber material, preferably being inserted into the mold.

Another aspect of the subject matter of the present invention which is in accordance with the invention or preferred is a vehicle seat having a seat member having a seat face, which is adjoined by two lateral members, wherein at least one resilient element is provided on each lateral member, in particular in an integral manner. The seat face can thereby be provided so as to be resilient and/or movable relative to the connection of the seat member to the bodywork of the vehicle. There is preferably provided at least one resilient element of plastics material, in particular fiber-reinforced plastics material. Preferably, at east one resilient element is constructed integrally with the lateral member and/or with the seat face.

The statements made relating to this subject matter of the present invention apply to the other aspects of the subject matter of the present invention in the same manner and vice versa.

The resilient element is preferably constructed as a leaf or leg spring. The resilient element is, for example, V-shaped, U-shaped, S-shaped, W-shaped, substantially circular or elliptical.

A front resilient element is preferably located in the region of the thigh support of the seat member and in a particularly preferred manner a rear resilient element is located in the region of the bottom support of the seat member. In a quite particularly preferred manner, these resilient elements have different resilient characteristic lines and/or different resilient excursions. Preferably, for the deformation of the resilient element in the region of the bottom, more force must be supplied than for the deformation of the resilient element in the region of the thigh support. In a particularly preferred manner, the resilient excursion with the rear resilient element is also longer. At least one, preferably the rear spring, may also be pretensioned without any load by a seat occupant, the resilience of the seat face thereby, for example, becoming harder.

Preferably or according to the invention, there is arranged on the lateral member, in particular in an integral manner, a resilient link by means of which a connection of the backrest of the vehicle seat to the seat member can be carried out. In particular, the resilient link acts in this instance as a rotary articulation for the backrest. Preferably, this resilient link is constructed as a leg spring, one leg being connected to the seat member and one leg being connected to the backrest connection and/or being provided in an integral manner. The transition between the two legs preferably constitutes the rotary bearing/rotary articulation for the backrest connection/backrest. The backrest of the vehicle seat is provided on the backrest connection, that is to say, the backrest is connected to the backrest connection or is provided integrally therewith.

The statements made relating to this subject matter of the present invention apply to the other aspects of the subject matter of the present invention in the same manner and vice versa.

The vehicle seat preferably has a recliner, by means of which the inclination of the backrest relative to the seat member can be adjusted.

According to another aspect of the subject matter of the present invention which is preferred or in accordance with the invention, at least one component, preferably a positive-locking closure means, in particular teeth, is provided integrally with the lateral member of the vehicle seat. There is preferably provided on the backrest and/or the backrest connection an adjustment and/or securing means, which cooperates with the positive-locking closure means on the lateral member in a positive and/or non-positive-locking manner, and thereby adjusts the backrest in terms of its inclination relative to the seat member and/or secures the backrest in the desired position. The adjustment can be carded out in a continuous or discontinuous manner.

The statements made relating to this subject matter of the present invention apply to the other aspects of the subject matter of the present invention in the same manner and vice versa.

According to another embodiment which is preferred or in accordance with the invention, the seat face is provided so as to be height-adjustable, the height adjuster being integrated in the lateral members.

The statements made relating to this subject matter of the present invention apply to the other aspects of the subject matter of the present invention in the same manner and vice versa.

The height adjustment may be carded out in a perpendicular manner. However, inclination adjustment is also possible with the height adjustment.

Preferably, the height adjuster changes the external form, in particular the vertical extent thereof, of the two lateral members.

Preferably, the lateral member has a recess whose shape, in particular the vertical extent thereof, changes during the height adjustment.

Preferably, the height adjuster has a drive element whose periphery changes in a reversible manner. The periphery of the drive means cooperates, for example, with components of the periphery of the recess and consequently changes the shape thereof and consequently the height of the seat face of the vehicle seat.

The drive element is preferably a helical element, for example, having a rotor, which has helical slots. There are preferably provided on the lateral members of the seat member, in particular in an integral manner, projections, for example, teeth, which co-operate in a positive-locking manner with the helical slots. During rotation, the teeth are moved away from each other or towards each other, whereby the adjustment of the height of the seat face is carried out.

Preferably, the drive element of the height adjustment is provided so as to be self-locking so that no independent adjustment of the height of the seat face can be carried out.

The drive element preferably cooperates with the recess. In the event of a movement of the drive element, for example, a rotation and/or translation, the shape of the recess is changed.

Preferably, the height adjustment has a second drive element which changes in particular the shape of the second resilient element. In a particularly preferred manner, the first drive element is directly or indirectly coupled to the second drive element so that, when one drive element is adjusted, the other is also adjusted.

The inventions are explained below with reference to FIGS. **1** to **7**. These explanations are given purely by way of example and do not limit the general notion of the invention.

FIGS. **1-3** show the vehicle seat according to the invention,

FIG. **4** shows possible embodiments of the resilient element,

FIGS. **5-5***b* show the drive of the height adjuster,

FIG. **6** shows the positive-locking means on the lateral member of the seat member,

FIG. **7** shows another embodiment of the height adjuster.

FIGS. **1-3** show the vehicle seat **1** according to the invention which has a seat member **2** and a backrest **3**, only the backrest connection **3** at which the backrest is provided being illustrated in the present instance. The backrest **3** is provided so as to be able to be rotated on the seat member by means of a recliner **11**. The seat member **2** has in the present case two lateral members **14**, between which the seat face **15** is provided. Preferably, the seat faces **15** and the lateral members **14** are integral, in particular provided so as to comprise a plastics material, in a quite particularly preferred manner fiber-reinforced plastics material. The upper rail **12** of a rail longitudinal adjustment system is provided, preferably integrally, on each lateral member **14**. More preferably, each lateral member has at least one, in the present case two, resilient element(s) **4**, **5** which are arranged between the transition of the lateral member to the seat face and the upper rail **12**. The front resilient element **4** is located in the region of the thigh support, whilst the rear resilient element **5** is located in the region of the bottom of the seat occupant. Both resilient elements **4**, **5** are preferably provided integrally with the lateral member and/or the seat face.

More preferably, the lateral member **14** has in the present case a resilient link **19** which is also preferably integrally connected to the lateral member **14**. This resilient link **19** acts as a support for the backrest **3** of the vehicle seat. In the present case, the resilient link **19** is constructed as a leg spring element, one leg being securely connected to the lateral member **14** and the other securely connected to the backrest connection **3**. The circle-segment-like transition between the legs acts as a rotation axis for the backrest. The resilient link **19** is preferably provided so as to comprise plastics material, in particular fiber-reinforced plastics material. In the present embodiment, a portion of the recliner **11**, that is to say, the positive-locking means **27**, is also provided integrally with the lateral member and preferably so as to comprise plastics material, in particular fiber-reinforced plastics material. In the present case, the positive-locking means **27** is provided as a slot, in which teeth are provided in the present case at two opposing sides of the slot. The slot is preferably constructed in the manner of a circle segment. The slot receives an adjustment and/or locking means **28**, which has positive-locking means which complement the positive-locking means **27** and which is, in particular rotatably, connected to the backrest and/or the backrest connection. Using the adjustment and/or locking means **11**, the backrest can be adjusted in terms of its inclination relative to the seat member and/or locked in the desired position in each case. The adjustment can be carded out in a continuous manner or in a discontinuous manner. Furthermore, in the present case the vehicle seat according to the invention has a height adjuster **16** which is integrated in the two lateral members **14** of the seat member. This height adjuster has an adjustment mechanism **6**, by means of which the height of the seat face **15** can be adjusted. In the present case, the adjustment mechanism **6** changes the shape of a recess **18**, which is located in each lateral member **14** between the connection of the seat face **15** to the lateral member **14** and the upper rail **12**. Owing to this change in shape, in which the shape of the resilient elements **4**, **5** is also changed, the seat face can be adjusted in terms of its height. This height adjustment can be carried out in such a manner that the seat face is displaced parallel with the original orientation thereof in an upward or downward direction, preferably in a purely perpendicular manner. However, an inclination adjustment of the seat face **15** is also possible during the height adjustment. In the present case, the adjustment mechanism **6** has a drive element **7**, for example, a helical positive-locking means, which cooperates with the inner side of the recess **18** and thereby changes its shape. Preferably, the drive element **7** is arranged in the front region of the seat face so that, in the event of an accident, in particular in the event of a front-end impact, so-called "submarining" can be prevented and the forces which occur only have to be absorbed partially by the resilient element **4**. The resilient element **4** can thereby be provided with a smaller resilient force than, for example, the resilient element **5**, which is advantageous in particular since the main load of the seat occupant has to be absorbed by the resilient element **5** and not by the resilient element **4**. Preferably, the drive element **7** is connected to another drive element **8**, **9**, **10**, which cooperates directly with the resilient element **5** and compresses it, if necessary. The position of the seat face **15** and/or the resilient force available can thereby be changed. In the present case, the second drive element comprises a cable pull **8**, which is connected to the drive element **7** in this instance by means of a roller **9**. When the drive element **7** is rotated, the cable **8** is pulled or released at the same time so that the shape of the resilient element **5** changes. In the cable

pull **8**, a step-down or step-up mechanism **10** of the adjustment path may be provided, for example, in the form of a pulley block.

FIG. **4** shows possible forms of the resilient element **4**, **5**. The shape of the resilient element is in particular selected in accordance with the resilient force and/or resilient excursion which is intended to be provided at what location, and/or which crash loads are intended to be absorbed. The person skilled in the art recognizes that the resilient elements **4**, **5** can be constructed differently. In particular it is advantageous for a greater resilient force to be provided with the resilient element **5** than with the resilient element **4** since this absorbs the main load of the seat occupant.

FIG. **5** shows a possible embodiment of the adjustment mechanism **6**. It has a rotor **20**, which is provided with helical slots. Positive-locking means, for example, teeth, which are provided above and below the recess **18**, preferably integrally with the lateral member, engage in these helical slots. The rotor **20** is rotated, for example, by means of a handle **22** or with a motor. The rotor **20** also rotates and the positive-locking means **21** above or below the recess **18** are pressed apart or pulled together. The rotation of the rotor **20** is transferred by means of a torque transmission **13** to a rotor which cooperates with positive-locking means of the other lateral member. The torque transmission **13** also preferably serves to stabilize the seat member. Details of the rotor **20** and the helical slots thereof can be taken from FIG. **5***a*. It can clearly be seen that the helical slots are provided at an end face of the rotor. As can be seen in particular with reference to FIGS. **5** and **5***b*, the adjustment mechanism has in the present case a second drive element which comprises a transmission means, in this instance a cable pull **8**, which has at one end thereof a connection means **24** which is connected to the handle **22** in a rotationally secure manner in this instance. At the other end thereof, the cable pull cooperates with the resilient element **5**. When the handle **22** is rotated, the cable pull **8** is also moved and thereby contracts the resilient element **5** or the spacing of the legs of the resilient element **5** increases. The cable pull **8** may have a translation means **10**, for example, a pulley block.

FIG. **6** shows the positive-locking elements **21**, which cooperate with the helical slots of the rotor **20**. Owing to a rotation of the rotor, the height adjustment HA is carried out, during which the members of the resilient element **4** are pulled together or pressed apart.

FIG. **7** shows another embodiment of the adjustment mechanism **6**. In the present case, it has a drive element, that is to say, a displacement element **26**, which can be displaced in the direction indicated by the double-headed arrow, for example, by means of rotation. This displacement element cooperates with the adjustment faces **25** of the lateral member and thereby presses them apart, whereby a height adjustment is carried out. The displacement element **26** can also be connected to another adjustment element, as illustrated, for example, in FIG. **5**, in order to change the shape of the resilient element **5**.

LIST OF REFERENCE NUMERALS

1 Vehicle seat
2 Seat member
3 Backrest, backrest connection
4 Front resilient element
5 Rear resilient element
6 Adjustment mechanism
7 Drive element, helical drive element
8 Transmission means, cable pull
9 Redirection roller
10 Step-up/step-down mechanism
11 Recliner
12 Upper rail
13 Torque transmission
14 Lateral member of the seat member
15 Seat face
16 Height adjuster
17 Carrier structure
18 Recess
19 Resilient link
20 Rotor with helical slots
21 Positive-locking means, projection
22 Handle, hand wheel
23 Slot, helical slot
24 Connection means
25 Adjustment faces
26 Drive element, displacement element
27 Positive-locking means, teeth
28 Adjustment/locking means
HA Height adjustment, vertical extent

The invention claimed is:

1. A vehicle seat comprising a seat member, having a seat face and two lateral members,
wherein the seat face is provided between the lateral members in an integral manner;
wherein the vehicle seat further comprises a height adjuster for adjusting a height of the seat face, wherein the height adjuster is integrated in the lateral members;
wherein each of the lateral members has a recess, a shape of which changes during the height adjustment;
wherein the height adjuster has a drive element;
wherein the drive element comprises a rotor with helical slots; and
wherein on the lateral members projections are provided which cooperate in a positive-locking manner with the helical slots, whereby during rotation of the rotor the projections are moved away from each other or towards each other, and whereby the height adjustment of the seat face is carried out.

2. The vehicle seat as claimed in claim **1**, wherein at least one resilient element is provided on each lateral member in an integral manner.

3. The vehicle seat as claimed in claim **2**, wherein at least two resilient elements are provided on each lateral member.

4. The vehicle seat as claimed in claim **3**, wherein the resilient elements have different resilient characteristic lines or different resilient excursions to absorb different loads in dependence of a location relative to a seat occupant and in dependence of forces in a crash situation.

5. The vehicle seat as claimed in claim **2**, wherein each lateral member has a resilient link in an integral manner, which is provided with a backrest connection in an integral manner.

6. The vehicle seat as claimed in claim **1**, wherein the drive element has a periphery that can be changed in a reversible manner by cooperating with components of a periphery of the recess to consequently change the height of the seat face.

7. The vehicle seat as claimed in claim **6**, wherein the drive element cooperates with the recess and changes a shape thereof.

8. The vehicle seat as claimed in claim **7**, wherein the height adjustment has a second drive element which changes a shape of a second resilient element.

9. The vehicle seat as claimed in claim 6, wherein the drive element cooperates with a positive-locking means, which are provided on the lateral member.

* * * * *